Women's fertility intentions and level of education: why are they positively correlated in Europe?

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Abstract

Increasing shares of European women are making large investments in their human capital. Whether and to what extent these investments are in conflict with reproductive behavior are issues that have repercussions for fertility levels. Using the most recent Eurobarometer data (2011) on individuals clustered in the 27 EU countries, I investigate the relationship between women's education and lifetime fertility intentions. The main hypothesis is that the two variables are positively correlated in countries in which the higher price paid by highly educated women for raising children is more than counterbalanced by the country's provision of childcare services, gender-egalitarian system, and favourable economic conditions. Results suggest that a positive association between women's level of education and lifetime fertility intentions exists at both the individual and country levels, as well as in a micro-macro integrated framework. This association is, however, not responsive to country differences in terms of childcare services, gender equality, and economic conditions. The main explanation for these findings—which remains to be proven by future research—is that, when policies and institutional contexts allow highly educated women to have larger families, women of reproductive ages are more prone to make investments in both human capital and family size, because these choices are not seen as incompatible alternatives.

Keywords: lifetime fertility intentions, reproductive decision-making, education, multilevel analysis, Eurobarometer, Europe.

1 INTRODUCTION

Fertility intentions play a central role in explaining contemporary fertility trends: they are among the strongest predictors of subsequent fertility and operate as key proximate variables in predicting fertility behaviour (Schoen et al. 1999; Ajzen 1991).

Fertility intentions are an important channel through which education affects fertility. The complex effect of education on fertility has been widely studied in the literature and is a highly relevant topic in research on reproductive behaviour (Kohler and Rodgers 2003). The diffusion of modern contraception has not levelled the socio-economic differentials in completed fertility (Sweet and Rindfuss 1983), as women who are college graduates still tend to have fewer children than women with high school degrees or lower levels of education (Yang and Morgan 2003). However, the relationship between fertility intentions and education is not necessarily the same as the relationship between actual fertility and education and little empirical research has been devoted to this issue. Empirical evidence indicates that highly educated people intend to have more children than less educated women (Heiland et al. 2008), but they ultimately have fewer children (Quesnel-Vallée and Morgan 2003; Bongaarts 2001). Consistently, highly educated women revise their birth intentions downwards more frequently than less educated women (Iacovou and Tavares 2011), especially near the end of their fertile years (Liefbroer 2009).

A positive and statistically significant cross-country correlation between the mean ultimately intended family size (the number of children already born plus the number of children the individual plans to have in the future) and the proportion of highly educated women of reproductive ages (20-45) has been observed in the three cross-sectional rounds of the Eurobaromter (EB) survey conducted in 2001, 2006, and 2011 (Testa and Grilli 2006; Testa 2010; Testa 2012).

It would be particularly valuable to gain more knowledge about the impact of education on fertility decision-making in Europe given that in

many European countries the share of highly educated women has been increasing over time while fertility has been declining.

The objective of the study reported here is to estimate how women's level of education influences women's lifetime fertility intentions through both individual- and aggregate-level effects and to illustrate the responsiveness of such relationship to different country demographic and socio-economic characteristics.

The study includes 27 countries of the European Union in which the Eurobarometer survey on fertility and climate change was undertaken at the beginning of 2011. I focus on lifetime fertility intentions, i.e., the number of children planned for the whole reproductive career, and estimate models for childless, parents with one child, and parents with two children separately because of the fundamentally different process involved in the decision to have a first, a second, or a higher birth order child.

The research aim is pursued by answering the following research questions: 1) Are women's educational levels and intended family sizes positively correlated? 2) What factors are responsible for this positive correlation? 3) How does this correlation vary from country to country; and, within countries, among women at different parities? 4) Does education at contextual level have an impact on woman's fertility intentions above and beyond that of her own education?

These are important questions to answer for both theory and policy reasons. They matter in terms of theory because they allow us to test the appropriateness of conventional explanatory and predictive models of decision-making about family formation for the target group of highly educated people. They matter in terms of policy because a gap between the desired and the actual family size has been found in European countries (Goldstein et al. 2003). This gap is particularly large among highly educated women, who typically have lower actual fertility levels but higher reproductive intentions than their less educated counterparts (Testa 2012). A reduction of such a gap is widely considered to be an important goal.

The remainder of the paper is organized as follows. First, I review the relevant literature on fertility and fertility intentions at macro and micro level. Next, I present research hypotheses, data, and methodology. This is followed by a description and interpretation of the main statistical findings and a discussion of possible caveats inherent to the analysis.

2 THEORETICAL FRAMEWORK

2.1 Explanations of low fertility

A variety of theories have been developed to explain low fertility. Each of these theories proposes a different approach that emphasises a particular set of determinants. The socio-economic explanation for low fertility focuses on the direct and indirect opportunity costs of having children (Becker 1981). According to this theory, women's increased economic independence, which is achieved through improved education and higher labour force participation, reduces the gains from marriage based on the interdependence of the traditional gender division of labour in the family, and increases the relative costs of childbearing. This is because it is assumed that women forgo earnings to care for children at home, or that they reduce their work hours. A second group of theories identify gender systems and gender inequality as the main sources of fertility differentials across countries, and are often used to explain the lowest-low fertility found in southern Mediterranean countries. McDonald (2000) has suggested that very low fertility may be the result of a hiatus between high levels of gender equity in individual-oriented institutions and sustained gender inequity in family-oriented social institutions. While women have, in recent years, had the same opportunities as men in education, and to some extent in the labour market, this has not occurred within the family. Women have become more empowered in their decision-making in relation to both household labour and fertility because their high levels of education allow them to question traditional roles (McDonald 2006). Another approach sees fertility

postponement, which may ultimately result in foregone fertility, as a rational response to the economic insecurity and increasing opportunity costs of childbearing for women (Kohler et al. 2002; Mills and Blossfeld 2005). Other theories focus on shifts in ideology and investment in children, and are often referred to in conjunction with the second demographic transition (van de Kaa 1987).

2.2 Education and reproductive decision-making

The theory of planned behaviour (TPB) (Ajzen 1991) posits that intentions are the most proximate determinant of the corresponding behaviour. According to this theory, intentions are formed under the immediate influence of three groups of factors: (a) personal positive and negative attitudes towards the behaviour, i.e., having a child; (b) subjective norms, i.e., perceived social pressure to engage or not to engage in the behaviour; and (c) perceived behavioural control, i.e., the ability to perform the behaviour, which may depend, for example, on the availability of housing, income, or other resources. Billari, Philipov, and Testa (2009), who have applied the general theory to the case of fertility, showed that the transition to parenthood is mainly driven by the existent normative pressure and individual personal attitudes towards childbearing, while perceived behavioural control plays a bigger role in the decision to have a second child. It may be assumed that perceived behavioural control has a positive effect on the fertility intentions of highly educated women (Testa 2010). The question is whether, and to which extent, the positive effect exerted by the perceived behavioural control might be counterbalanced by a negative effect exerted by the norms and attitudes. Norms contribute substantially to the negative effects of educational enrolment on women's fertility (Blossfeld and Huinink 1991; Morgan and Rackin 2010; Billari and Philipov 2004), which demonstrates the importance of enrolment itself, regardless of the achieved educational level. In the motivational traits-desires-intentions-behaviour theoretical structure (Miller 1994), individuals go through a

sequence of steps that starts with psychological traits, such as childbearing motivations, and are activated by desires, which are in turn translated into intentions. The final outcome of the childbearing decision process is a conception and a fertility event related to it, such as childbirth or an induced or spontaneous abortion. Traits are defined as a disposition to feel, desires are wishes that do not lead to action, and intentions are conscious commitments to act that take into account the perceived desires of significant others, especially of the partner, and other situational factors. Miller (1992) demonstrated that childbearing motivations are negatively associated with educational level because having a high level of education gives women a higher degree of autonomy and promotes activities competitive with childbearing. The exposure to life course paths competitive with childbearing, such as the completion of education, also plays a crucial role in explaining the transition to parenthood (Barber 2001). The sign of the correlation between women's education and reproductive intentions depends on whether the desires of significant others and the situational constraints considered by highly educated women in their decision-making process counterbalance the negative effects that stem from their increased level of autonomy.

Highly educated women tend to substitute child numbers with child quality (Becker and Lewis 1973). Since childbearing and childrearing are time-intensive, an increase in wage rates induces a negative substitution effect on the demand for children (Becker 1965). A woman's income is, therefore, negatively associated with childbearing, as having a higher income level implies there are higher opportunity costs associated with having children. For men, by contrast, the positive income effect tends to dominate, as they spend less time raising children, although the magnitude of these effects will vary across countries and birth parities (Butz and Ward 1979). Consistent with this view is the hypothesis that the time demands and the values associated with higher-status occupations compete with positive childbearing motivations (Miller 1992), and induce women in such positions to postpone the birth of their first child in order to achieve an optimal trade-

off between human capital investments and career plans (Gustafsson 2001; Mills and Blossfeld 2005).

3 RESEARCH HYPOTHESES

Highly educated women are exposed to life course paths that compete with childbearing, but they do not necessarily plan to have smaller family sizes than less educated women (Heiland et al. 2005; Mills et al. 2008; Hayford 2009). Some women in high-status occupations may intend to have fewer children from the beginning of their reproductive careers (Friedman et al.1994), while others may later decide to forgo having some of the children they had initially planned to have over the course of their reproductive careers (Iacovou and Tavares, 2011). Better educated women are more prone to postpone having children than less educated women (Heaton et al.1999; Schoen et al. 1999), and, consequently, they are more likely to have fewer children than they had initially intended. The mechanisms that could account for this are: 1) declining fecundity with age, which may result in involuntary childlessness; 2) repeated postponements, because of competing activities; 3) lack of partner, or partnership instability (Morgan and Rackin 2010). It is unclear whether and to what extent highly educated women are able to anticipate the negative effects of postponement on their reproductive careers. This ability may be captured by the level of certainty attached to their fertility intentions since uncertainty may be an acknowledgement that delaying childbearing could lead to forgoing having children (Morgan 1981 and 1982). We could expect that after the transition to parenthood the limited time left out for having additional children is reflected in a higher level of uncertainty attached to the reproductive plans and that after controlling for this uncertainty the intentions of highly educated women become lower than those of the less educated counterparts.

I formulate my first research hypothesis as follows:

HP1. *The relationship between level of education and lifetime fertility intentions is positive at the beginning of women's reproductive careers, but it becomes negative after the birth of the first child.*

A crucial issue in investigating the relationship between women's human capital and fertility intentions is whether the positive income effect is greater than the negative substitution effect. I focus on three different channels through which the positive effect of the women's increased education on fertility decisions may be strengthened: availability of childcare services, gender systems, and economic conditions.

An important extension to the argument provided by Becker is based on the assumption that women's fertility decisions depend not only on their wages, but also on the availability of external childcare. At the highest level of education, the income effect may be greater than the substitution effect, especially when childcare can be purchased in the market (Ermisch 1989; Del Boca and Pasqua 2005).

Cross-studies of differences in the relationship between women's human capital and fertility decisions might reflect the differences across countries in the provision of childcare services. I formulate my second research hypotheses as follows:

HP2. *The relationship between women's level of education and lifetime fertility intentions is positive in those countries in which the availability of childcare services offsets the high opportunity costs paid by highly qualified women for having children.*

Both of these effects are assumed to be more pronounced after the birth of a first child.

In addition to the income and the substitution effects, a third mechanism linking income to childbearing is the price of time effect, which refers to the ability to combine work and family (Becker 1981). If gender relations within the couple move in a more egalitarian direction in response to the increased economic opportunities of highly educated women, the lower price of time effect can compensate for the higher substitution effect among highly educated women (Oppenheimer 1994). The literature has

shown that, in egalitarian gender systems, the price of time effect may be reduced for women (Liefbroer and Corjin 1999; Jansen and Liefbroer 2006), and that, in countries in which high levels of gender equity in education and the labour market are combined with low levels of equity in the family, fertility is particularly low (McDonald 2000). I formulate my third research hypothesis as follows:

HP3. *The relationship between women's level of education and lifetime fertility intentions is positive in those countries in which egalitarian gender roles in the family and in the market offset the high price of time paid by highly qualified women for having children.*

As we saw for hypothesis 2, the effects are assumed to be particularly pronounced after the birth of a first child, when a woman has a better idea of the amount of help with childcare duties she can expect to receive from her partner (Mills et al. 2008).

A positive relationship has been detected between child-timing intention (i.e., the intention to have a child in the next three years) and a country's level of GDP per capita (Testa 2010): i.e., people living in countries with a high GDP per capita tend to anticipate the birth of a second child. This finding is in line with studies showing a positive link between fertility and economic development (Luci and Thévenon 2011; Myrskylä et al. 2009) and suggests that reproduction and economic development are not necessarily negatively associated. I therefore formulate my fourth research hypothesis as follows:

HP4. *The relationship between women's level of education and lifetime fertility intentions is positive in those countries with a higher level of GDP per capita.*

Here I assume that a country's favourable economic conditions may have positive repercussions for fertility, as has been shown in previous studies (Luci and Thévenon 2011). There could be several mechanisms driving such a relationship: the high levels of GDP per capita are also typically linked with an increased level of well-being and life satisfaction (Testa 2012) which may bolster fertility and fertility intentions.

4 DATA AND METHODS

4.1 The sample

The empirical analysis is based on the Eurobarometer survey carried out in 2011 in the 27 EU countries. The stratified sampling procedure assures nearly equal probability samples of about 1,000 respondents in each of the countries. The sample size allows equally precise estimates for small and large countries, as well as to make comparisons between sub-groups broken down by sex, age, education, marital status, and so on. The survey used a single uniform questionnaire design, with particular attention being paid to equivalent question wording across languages.

The analytical sample consists of 8278 men and women aged 20 to 45 who answered the question on fertility intentions, including 3556 childless respondents, 2096 respondents with only one child, and 2626 respondents with two or more children. The non-response rate was around 12%. A missing answer may be symptomatic of certain fertility plans (Morgan 1981 and 1982). However, I simply excluded from the analysis all individuals who did not report any intended family size in order to avoid potential complications given the absence of auxiliary information on this item. The results obtained from the analysis run on the sub-set of valid responses are reliable under the standard "missing at random assumption" (Little and Rubin 2002).

The models are formally based on two levels: individuals and countries (referred to as "clusters") as described in Table 1. As is shown in this table, the hierarchical structure is quite unbalanced. This lack of balance is not a problem, as it is efficiently handled by maximum-likelihood methods. The number of clusters and their sizes are sufficient to achieve high levels of power and accuracy of the asymptotic distributions of the estimators (Snijders and Bosker 1999), and thus allow for reliable inferences.

Table 1 Structure of the data: respondents aged 20 to 45 by country and parity. Eurobarometer 2011

	Parity		
Countries	0	1	2
Austria	174	75	103
Belgium	149	71	112
Bulgaria	104	107	118
Cyprus	98	24	49
Czech Rep.	145	101	162
Denmark	122	57	93
Estonia	115	95	110
Finland	91	44	74
France	123	76	111
Germany east	103	47	40
Germany west	124	55	70
Greece	209	68	92
Hungary	130	95	119
Ireland	96	73	86
Italy	169	83	99
Latvia	151	147	122
Lithuania	141	82	109
Luxembourg	72	43	52
Malta	48	33	47
Netherlands	164	41	86
Poland	95	67	70
Portugal	119	99	94
Romania	135	126	98
Slovakia	125	89	135
Slovenia	137	67	84
Spain	177	86	118
Sweden	85	49	56
U. Kingdom	155	96	91
Total	3556	2096	2600

4.2 Response variable: lifetime fertility intentions

The response variable, i.e., the intended number of children, was measured through the following item: "*How many more children do you intend to have?*" A range from zero to up to six children was given in the questionnaire as a response option. The prospective item was asked immediately after the question about the number of children already had

("*How many children, if any, have you had?*") and was clearly intended to provide information about the number of births respondents plan to have over (the rest of) their reproductive careers. Neither of the above-mentioned questions made a distinction between biological and adopted children.

The response variable was coded as a four-category variable: zero, one, two, and three or more children. Values greater than or equal to three were, in light of their low frequency, collapsed into a single category.

Certainty levels of lifetime fertility intentions were also used. They were measured through the following survey item: "*How certain are you that you will have the number of children that you have just mentioned*?" Response options were: "very sure", "fairly sure", "not very sure", and "not at all sure". All of the respondents who provided a valid numerical answer other than "0 child" to the question on the number of children they intended to have answered the question about their certainty level.

4.3 Explanatory variables

The explanatory variables of the models are as follows: age, sex, enrolment in education, level of education, marital status, employment status, and self-location on the social scale. All of the covariates refer to the time of the interview. Unfortunately, the data do not carry any retrospective information concerning the previous history of respondents, which would have allowed me to estimate the role of biographical trajectories on the process of forming family size intentions in a dynamic framework.

Although the main focus of the analysis is on women, models were not restricted to a female sub-sample; rather, I included the gender variable, while testing for interaction effects between gender and all of the other relevant explanatory variables in the models. Only significant interactions were retained in the final models.

The age of respondents is the only continuous covariate. It was centred on the rounded mean value of 33 years. As all of the other covariates are categorical, they were transformed into suitable dummy variables. Some

collapsing of the categories was often needed: in such cases, several alternative collapsing schemes were tried in the model selection process.

The educational level was measured with the following survey question: "*How old were you when you stopped your full-time education?*" and considered as a three-category variable with low (up to 15 years) medium (between 16 and 19) and high (20 years or above) level of education. A dummy variable indicating whether respondents were still enrolled in education at the time of the survey was also added.

The marital status was coded using four categories: single, married, cohabiting, and separated. The last category also included divorced respondents, while the married respondents were grouped together with the remarried and the widowed people.

The employment status has just two categories: employed respondents and people not in the labour market or unemployed. A more refined breakdown of the variable was not supported by the data.

The country-level explanatory variables of the models are as follows: the gross domestic product (GDP) in purchasing power standards (PPS) as of 2006, taken from the Eurostat database; the share of women in the country with higher levels of education (levels 4, 5, and 6, according to the 1997 ISCED classification), taken from the Labour Force Survey (year 2008); the share of enrolment in formal childcare for preschool children aged three, taken from OECD Family Database (year 2008); the year of the onset of fertility postponement, kindly provided by Tomáš Sobotka; and the share of people who disagree (either tend to disagree or completely disagree) with the statement: "*Ideally, the woman should stay at home to look after the children while the man goes out to work*", taken from the previous round of the Eurobarometer survey (2006).

The volume index of GDP per capita in purchasing power standards is expressed in relation to the European Union (EU-27) average, set to equal 100. If the index of a country is higher than 100, this country's level of GDP per capita is higher than the EU average, and vice versa. The basic figures are expressed in PPS; i.e., in a common currency that eliminates the

differences in price levels between countries, which allows for more meaningful volume comparisons of GDP between countries.

A description of all the variables used in the models is reported in Table 2.

Table 2 Description of the individual- and country-level variables used in the analysis

a. *Individual-level variables*. Percentage distributions

	Parity			
	0	1	2	all
Age (average)	29	34	37	33
Female	45	62	62	55
Male	55	38	38	45
Married	16	62	75	50
Cohabiting	26	18	12	19
Single	56	11	5	25
Separated	2	9	8	6
Low education	6	10	13	10
Medium education	40	53	53	48
High education	35	36	33	34
Enrolled in education	20	1	1	8
Employed	64	74	72	70
Unemployed or inactive	36	26	28	30
Low self-positioning on the social scale*	45	53	53	50
High self-positioning on the social scale	55	47	47	50

Note: *Respondents were asked to position themselves on the social scale. The scale had 10 levels: one for the lowest level in society and 10 for the highest level in society.

b. *Country-level variables*

	GDP per capita (in pps)	Onset of fertility postponement (year)	People with gender-egalitarian attitudes (%)	Preschool children in formal childcare services (%)	Women with high level of education (%)
Austria	125	1974	33	69	32
Belgium	118	1976	66	98	43
Bulgaria	37	1993	49	75	26
Cyprus	91	1986	37	85	49
Czech Rep.	77	1992	29	67	17
Denmark	124	1976	79	96	37
Estonia	65	1994	26	85	46
Finland	114	1971	39	70	43
France	109	1972	65	94	38
Germany west	116	1972	46	93	32
Germany east	116	1980	78	93	32
Greece	93	1984	35	61	40
Hungary	63	1980	18	79	25
Ireland	145	1982	41	93	52
Italy	104	1977	45	91	20
Latvia	52	1994	32	66	36
Lithuania	55	1995	42	57	55
Luxembourg	272	1973	51	51	34
Malta	77	1985	24	55	27
Netherlands	131	1972	60	89	35
Poland	52	1992	31	30	33
Portugal	76	1984	40	64	23
Romania	38	1992	50	67	18
Slovakia	63	1992	45	77	16
Slovenia	88	1984	49	67	28
Spain	105	1980	51	91	38
Sweden	121	1973	65	92	44
U. Kingdom	120	1972	48	89	34

Source: Eurostat for GDP; Labour Force Survey of women in higher education; OECD family policy database for children under age three enrolled in childcare services; Eurobarometer, round 2006, for gender attitudes regarding childcare duties; T. Sobotka (2004: 53, Table 3.3) expanded and updated by the author, for the year of the onset of fertility postponement.

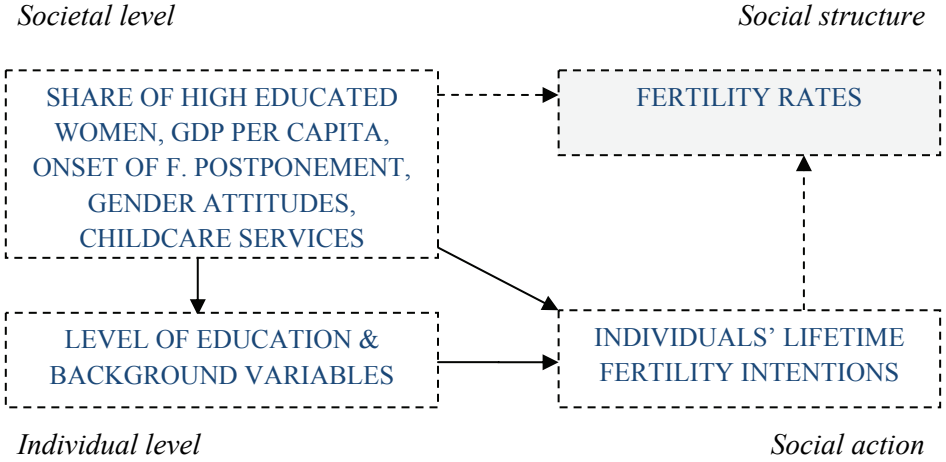
4.4 The micro-macro framework

Multilevel models were run in order to represent the complex causal process underlying the behaviour of individuals living in a social context, and to draw valid inferences regarding the relationships at the relevant hierarchical levels. As is usual in a multilevel setting, the clustering of individuals in countries is a phenomenon of interest, rather than a mere disturbance (Snijders and Bosker 1999).

In Scheme 1, freely inspired by Coleman (1990), the multilevel framework is adapted to the study of individuals' lifetime reproductive intentions. The box visible at the top right of the scheme is related to fertility rates, which are not investigated in the current analysis, but depend on the relationship explicitly considered in the current study.

A crucial characteristic of the multilevel setting is that the effect of the context on the individual outcome can be estimated after a control for the individual-level characteristics is included in the model (the diagonal line in the scheme).

Scheme 1 A micro-macro model of fertility



Source: inspired by Coleman 1990

4.5 The model

The multilevel analysis relies on the random intercept version of the proportional odds model for ordinal responses (e.g., Agresti, 2002). All of the models were run separately by parity: zero, one, and two children. As was stated in the rational choice theories approach (Yamaguchi and Ferguson 1995), fertility intentions may change after each new birth, in line with the concept of a conditional-sequential fertility decision-making process (Namboodiri 1972). A problem arises when there is selection in a parity-specific analysis; i.e., there are unobservable variables that could be correlated with the probability of having a child in parity n, as well as with the probability of intending to have a child of the next order, n+1. The consequence is a biased and inconsistent estimator. This problem was not tackled here because of a lack of adequate longitudinal retrospective information, but the related issue is discussed in the concluding section.

The proportional odds model could be extended to handle partial proportional odds (Williams 2006), but then the interpretation becomes somewhat tortuous. Since only a few covariates in each model violated such an assumption, and since they did so only slightly, the proportional odds multilevel models were preferred.

5 RESULTS

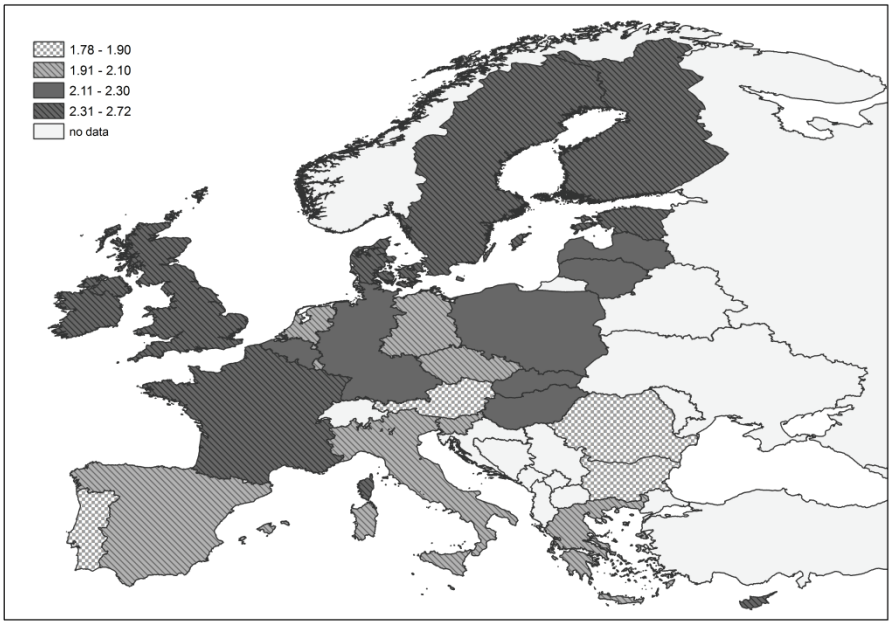
5.1 Cross-country differences in ultimately intended family size

Looking at the cross-country differences in the mean ultimately intended family size of women of reproductive ages (20-45), we can spot several clusters of countries with similar values, as shown in Figure 1.

Going from the lowest to the highest level of ultimately intended family size, the first cluster of countries encompasses Austria, Portugal, Romania and Bulgaria with mean values clearly below the replacement level, ranging between 1.8 and 1.9. The second group includes Italy, Spain,

Greece, Slovenia, Malta Czech Republic, the Netherlands, Luxembourg and eastern Germany, with mean values slightly below the replacement level, ranging between 1.9 and 2.1. The third group of countries encompasses western Germany, Belgium, Hungary, Slovakia, Poland, Latvia and Lithuania with mean values at the replacement level, ranging between 2.1 and 2.3. The last group of countries includes Ireland, the United Kingdom, France, Denmark, Sweden, Finland, Estonia, and Cyprus with mean values above 2.3.

Figure 1 Mean ultimately intended family size in Europe (EU-27). Women aged 20-45



Source: Eurobarometer data 2011

This clustering roughly reflects the cross-country family policy differences detected in a recent study (Thévenon 2011). In the southern European countries, grouped in the first and second clusters with the lowest levels of ultimately intended family size, the family policies are

characterised by limited periods of paid child-related leave, limited provision of childcare services for children under age three, low volumes of cash transfers, but effective tax rates that provide incentives to work and to have a second earner in the household.

The Nordic countries, grouped in the cluster with the highest levels of ultimately intended family size, provide a substantial level of policy support to parents with children under age three, allowing them to easily combine work and family. The forms of support include a long full-time-equivalent period of father-specific leave (around 10 weeks in Sweden, compared to an average of 1.7 weeks across the OECD countries), tax advantages for dual-earner households, and high enrolment rates of children under age three in formal childcare.

The continental European countries, with a mean ultimately intended family size at EU-27 average levels, are mainly grouped in the second and third cluster; the only exceptions are Austria with a lower level and France with a higher level. In these countries the policies are characterised by a generous level of support, which is, however, not targeted at facilitating the balancing of work and family. The level of spending on families with small children is rather high, but the support is aimed at compensating families for the costs of raising children. The taxation system does not encourage the labour market participation of both parents, as the period of leave entitlement is rather long (with the exception of the Netherlands), and the enrolment rates of children under age three in formal care is low; the rates are actually higher in Belgium, France, and Luxembourg; and are lower in the Netherlands, Germany, and Austria.

In the eastern European countries, the policies are rather heterogeneous, with Hungary having the most comprehensive level support for parents with young children. This heterogeneity is consistent with the fact that these countries are present in each of the four clusters outlined above.

A similar clustering of countries was obtained by considering the ultimately intended family size of highly educated women. Only eight

countries were listened in a different cluster: Italy, Slovakia, Slovenia and Malta, which were in the adjacent cluster with higher UIFS values, and the United Kingdom, Denmark, Cyprus and Latvia which were in the adjacent cluster with lower UIFS.

5.2 The validity and the predictive value of lifetime fertility intentions

Before moving on to the analysis of the relationship between lifetime fertility intentions and education, which is the central core of his study, it is worth comparing the ultimately intended family size, as derived from the EB survey data, with a measure of projected cohort fertility obtained from the recent study conducted by Myrskylä et al. (2012). If the two measures are consistent, the ultimately intended family size can be considered an adequate approximation of the complete family size. The female cohorts are those born between 1972 and 1986 (aged 25-39 at the time of the survey, 2011) in the EB data, and those born in 1979 in the study on the projected cohort fertility (Myrskylä et al.2012). The two measures were found to be strongly correlated with each other (Pearson's correlation coefficient was equal to 0.8). Most importantly, the differences between the two indicators were quite low, ranging between ±0.34 children after adjusting for the fact that not all of the planned children are actually born (Table 3). This finding suggests that the ultimately intended family size, as computed from the EB survey data, and the projected cohort fertility, as computed by using national statistics as a basis for the projection, move in the same direction. This evidence not only supports the validity and consistency of the EB survey data, it also suggests that the ultimately intended family size has a good predictive power. To further check the validity of the EB survey data a comparison between the actual family size for women aged 40-54, as computed with the EB survey data; and the cohort fertility of women born in 1960, as computed by the national statistics, has been carried out. The results have shown that the two data sources are consistent, with the exceptions of western Germany, for which the EB data clearly over-estimate cohort fertility, and Sweden, for which the EB data clearly under-estimate fertility.

Table 3 Ultimately intended family size for women born between 1972 and 1986 and cohort estimated fertility for women born in 1979

	Ultimately intended family size (UIFS), women aged 25-39			Cohort fertility women born in 1979		Countries with the following differences		
	Low variant	High variant	Medium variant		Diff	<0.1	>0.1 & <0.2	>0.2
			(a)	(b)	(a-b)			
Austria	1.27	1.54	1.41	1.59	0.19		x	
Belgium	1.59	1.87	1.73	1.92	0.19		x	
Bulgaria	1.45	1.72	1.59	1.69	0.11		x	
Czech	1.50	1.76	1.63	1.75	0.13		x	
Denmark	1.72	2.08	1.90	1.98	0.08	X		
Estonia	1.78	2.16	1.97	1.91	-0.06	X		
Finland	1.78	2.12	1.95	1.91	-0.04	X		
France	1.91	2.31	2.11	2.08	-0.03	X		
Germany east	1.22	1.47	1.35	1.57	0.23			x
Germany west	1.46	1.76	1.61	1.57	-0.03	X		
Greece	1.37	1.77	1.57	1.64	0.07	X		
Hungary	1.76	2.07	1.92	1.58	-0.34			x
Ireland	1.99	2.42	2.21	2.16	-0.04	X		
Italy	1.12	1.54	1.33	1.47	0.15		x	
Lithuania	1.57	1.92	1.75	1.84	0.10		x	
Luxembourg	1.57	1.83	1.70	1.84	0.14		x	
Netherlands	1.31	1.69	1.50	1.84	0.34			x
Poland	1.48	1.77	1.63	1.57	-0.05	X		
Portugal	1.53	1.72	1.63	1.47	-0.16		x	
Romania	1.37	1.60	1.49	1.55	0.07	X		
Slovakia	1.47	1.79	1.63	1.63	0.00	X		
Slovenia	1.42	1.78	1.60	1.72	0.12		x	
Spain	1.28	1.61	1.45	1.4	-0.04	X		
Sweden	1.58	1.98	1.78	2.03	0.25			x
U. Kingdom	1.65	2.01	1.83	2.02	0.19		x	
Tot. number of countries						11	10	4

Note: The ultimately intended family size is taken from the 2011 EB survey and it is weighted with a factor equal to 0.3 (low variant) or to 0.7 (high variant) to take into account the fact that only a share of these fertility intentions are realised (evidence shows that this share lies between these two values). The medium variant, which is computed as an average between the low and the high variants, is compared with the cohort fertility of women born in 1979.

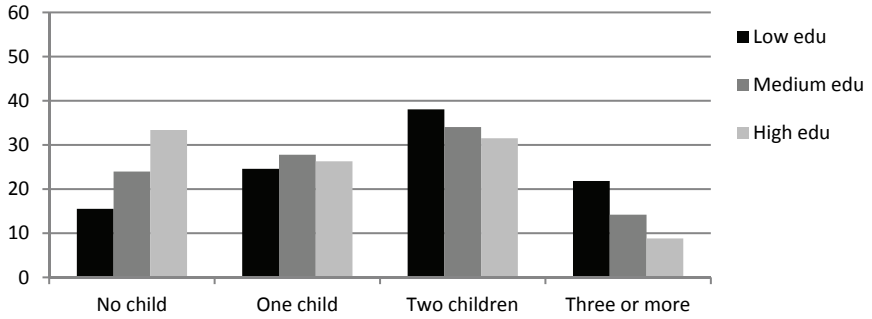
5.3 The relationship between education and lifetime fertility intentions

Looking at the parity distribution of women by level of education in the EU-27 as a whole, it is evident that highly educated women are under-represented in the high parities of three or above, but they are over-represented in the lower parities of zero and one, if the actual number of children is considered (Figure 2, panel a); while they are over-represented in the high parities if the ultimately intended number of children (Figure 2, panel c) or the additionally intended number of children for the childless sub-sample (Figure 2, panel b) are considered. These differences are related to the different timing of childbearing adopted by highly educated women and less educated ones, with the former usually delaying family formation longer than the latter. The distribution of women by actual family size also suggests that a bipolarisation process might be behind the reproductive choices of women with high levels of education, in which they more frequently select the "no child" or "two children" option than the "one child" option (Figure 2, panel a). The two-child family was the most preferred family size of the respondents in all the three education categories (Figure 2, panel b and c) while the actual two-child family was as frequent as the no-child family among the highly educated women (Figure 2, panel a).

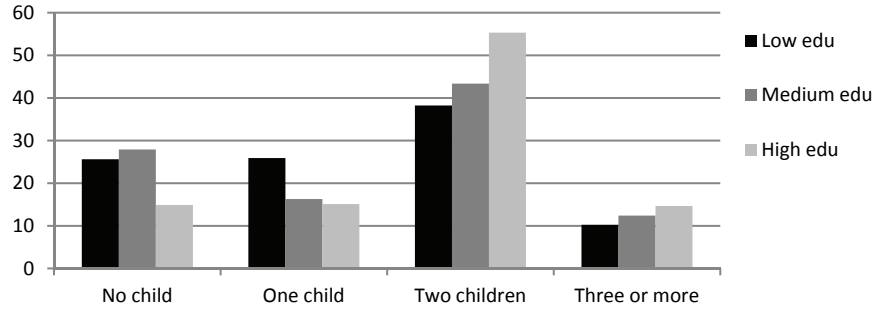
In two out of three EU countries, the distribution of highly educated women by actual number of children showed a higher concentration at parities zero and two than at parity one with the eastern European countries being the main exceptions. An analogous bipolarisation was not observed for the lifetime fertility preferences with the only exception of two countries, the Netherlands and the United Kingdom, where having one child was a very uncommon preference (8% and 4% of highly educated women aged 20 to 45 preferred this option) (Table 4).

Figure 2 Distribution of women aged 20-45 by actual, additionally, and ultimately intended family size and educational levels, EU-27

Panel a. Actual family size. All women



Panel b. Additionally intended family size. Childless women



Panel c. Ultimately intended family size. All women

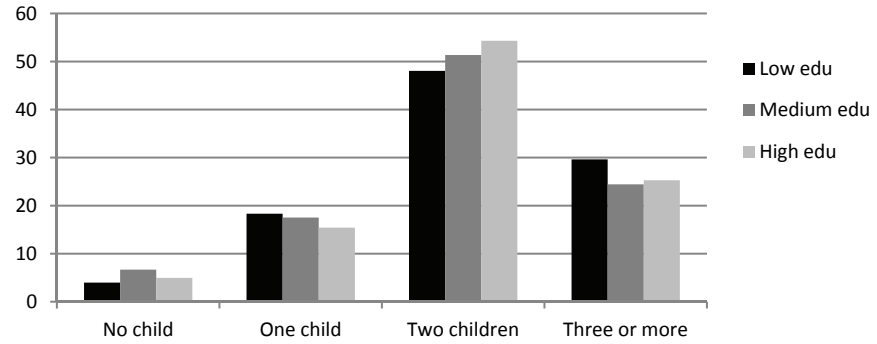


Table 4 Distribution of highly educated women aged 20-45 by actual and ultimately intended family size

	Actual family size			U-	Ultimately intended family size			U-
	0	1	2	shape	0	1	2	shape
Austria	38	26	36	x	4	37	58	
Belgium	35	19	46	x	11	13	77	
Bulgaria	30	38	33		0	19	81	
Cyprus	59	11	30	x	5	7	89	
Czech Rep.	25	35	41		4	11	85	
Denmark	21	25	54	x	8	10	82	
Estonia	23	33	44		1	9	90	
Finland	30	18	52	x	10	11	79	
France	32	24	44	x	2	13	85	
Germany West	26	23	51	x	7	21	72	
Germany East	29	32	39		7	25	68	
Greece	54	17	29	x	5	21	74	
Hungary	38	23	39	x	0	19	81	
Ireland	25	29	46		3	7	90	
Italy	36	29	35	x	6	16	78	
Latvia	26	35	39		5	17	77	
Lithuania	33	25	42	x	1	15	84	
Luxembourg	36	20	45	x	9	11	81	
Malta	48	16	36	x	5	19	76	
Netherlands	45	14	41	x	14	8	78	x
Poland	31	32	37		2	21	77	
Portugal	50	21	29	x	11	27	62	
Romania	41	46	12		2	36	62	
Slovakia	39	23	38	x	2	16	82	
Slovenia	32	32	36		4	17	80	
Spain	37	21	42	x	3	17	80	
Sweden	30	26	44	x	3	10	87	
U. Kingdom	33	28	39	x	9	4	87	x
Tot. Number of countries				19				2

Note: The row percentages sum up to 100 in each panel. The countries with a U-shape distribution are those in which the proportion of women with only one child (or only one ultimately intended child) is lower than the proportions of women with zero and two children (actual or ultimately intended).

Moving on to the analysis of the mean values, it can be noticed that women with high levels of education have a smaller mean actual family size but a larger mean intended family size than their less educated counterparts in most of the EU countries (Table 5; Figure A.2).

In 15 of the 27 countries (namely: Romania, Bulgaria, the Czech Republic, Hungary, Cyprus, Greece, Portugal, Finland, France, the United Kingdom, Denmark, Austria, Germany, Luxembourg, and the Netherlands), the mean ultimately intended family size was higher for the women with low to medium levels of education than it was for the highly educated women. In five of the 27 EU countries (Poland, Latvia, Lithuania, Slovenia, and Spain), the mean ultimately intended family size did not substantially differ by educational level. In another seven EU countries (Ireland, Sweden, Estonia, Belgium, Slovakia, Malta, and Italy), the mean ultimately intended family size was greater among highly educated women than among less educated women. In this group of countries, the smaller actual family size of highly educated women relative to less educated women was more than compensated for by the larger number of intended children. The only exception was Italy, where both the mean actual and the mean intended family size were higher among women with high levels of education than among women with low to medium education levels. Using the three categories of low, medium, and high levels of education separately, it appeared that less educated and highly educated women had higher mean values than women with medium levels of education in several countries. Here, for the sake of simplicity and because of the limited size of some national samples, the results for women with medium-low and high levels of education are described.

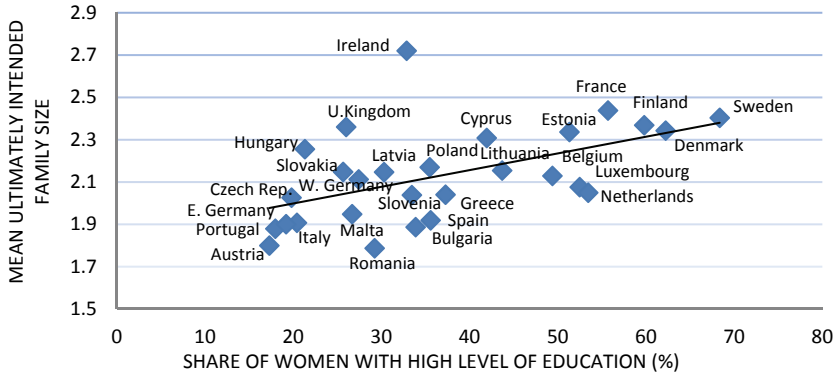
Table 5 Mean actual, mean additionally intended and mean ultimately intended family size by level of education. Women aged 20-45

	Actual family size (AFS)		Additionally intended family size (AIFS)		Ultimately intended family size (UIFS)		Countries in which highly educated women have a mean UIFS bigger, equal, or smaller than the less educated counterparts		
	Low edu	High edu	Low edu	High edu	Low edu	High edu	High > Low	High = Low	High < Low
Austria	1.2	1.1	0.6	0.4	1.8	1.5			X
Belgium	1.6	1.4	0.5	0.8	2.1	2.2	X		
Bulgaria	1.4	1.0	0.5	0.9	1.9	1.8			X
Cyprus	1.9	0.9	0.5	1.3	2.4	2.1			X
Czech Rep.	1.5	1.2	0.6	0.8	2.1	2.0			X
Denmark	1.5	1.6	1.3	0.6	2.8	2.2			X
Estonia	1.7	1.4	0.6	1.0	2.3	2.4	X		
Finland	1.8	1.5	0.7	0.8	2.5	2.3			X
France	1.9	1.3	0.7	1.1	2.6	2.4			X
Germany	1.5	1.3	0.5	0.8	2.0	2.0		X	
Greece	1.4	0.9	0.7	1.1	2.1	2.0			X
Hungary	1.6	1.2	0.7	1.0	2.3	2.2			X
Ireland	1.9	1.7	0.8	1.2	2.7	2.9	X		
Italy	1.0	1.1	0.8	1.1	1.8	2.2	X		
Latvia	1.7	1.2	0.5	0.8	2.2	2.0			X
Lithuania	1.5	1.2	0.7	1.0	2.2	2.2		X	
Luxembourg	1.8	1.3	0.3	0.7	2.1	2.0			X
Malta	1.4	1.1	0.5	1.1	1.9	2.2	X		
Netherlands	1.4	1.0	0.8	0.9	2.1	1.9			X
Poland	1.7	1.2	0.5	1.0	2.2	2.2		X	
Portugal	1.5	0.8	0.4	0.9	1.9	1.7			X
Romania	1.6	0.7	0.2	1.0	1.8	1.7			X
Slovakia	1.4	1.0	0.6	1.4	2.0	2.4	X		
Slovenia	1.6	1.2	0.5	0.9	2.1	2.1		X	
Spain	1.3	1.1	0.5	0.8	1.9	1.9		X	
Sweden	1.8	1.4	0.3	1.0	2.1	2.4	X		
U. Kingdom	1.7	1.2	0.7	1.0	2.4	2.2			X
N. countries							7	5	15

The cross-country bivariate correlation between education and lifetime fertility intentions was found to be positive: the countries with a higher share of highly educated women of reproductive ages were also the countries in which women of reproductive ages tended to have higher mean ultimately intended family sizes (Figure 4). The Pearson's correlation coefficient was equal to 0.5 and statistically significant. This finding was robust to the use of a different measure of the share of highly educated women (i.e., the country mean of the individual-level variable as computed from the individual records of the 2011 EB dataset). In addition, the correlation did not substantially change when the analysis was restricted to either childless women or women with only one child, when the Scandinavian countries were excluded, and when the mean additionally intended family size was weighted with the certainty levels of intentions. Importantly, a similar positive association between education and lifetime fertility intentions was detected in the 2006 EB round.

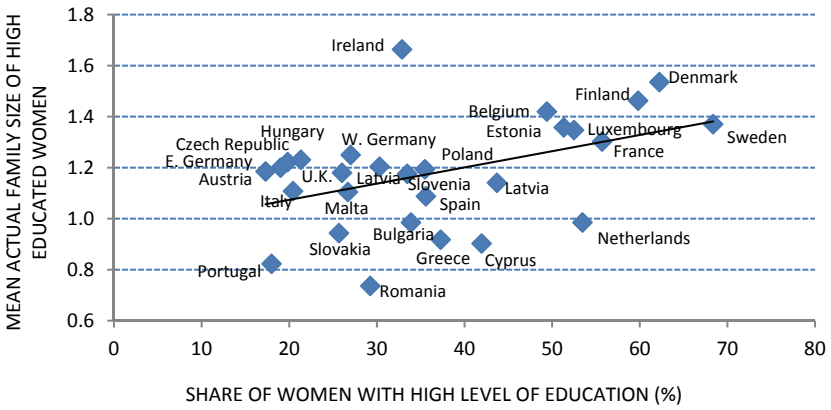
Interestingly, the scatter plot between the country share of highly educated women and the mean actual family size of highly educated women (Figure 5) roughly resembles the scatter plot showing the association between the country share of highly educated women and the women's mean ultimately intended family size (Figure 4). This result points out that countries in which women make greater investments in human capital are also those in which highly educated women have larger families.

Figure 4 Cross-country correlation between the mean ultimately intended family size and the share of highly educated women. Ages 20 to 45



Note: Pearson's correlation coefficient is equal to 0.5 and statistically significant.

Figure 5 Cross-country correlation between the mean actual family size and the share of highly educated women. Ages 20 to 45



Note: Pearson's correlation coefficient is equal to 0.5 and statistically significant.

5.4 The multivariate analysis: an overview of the results

In Table 6, the estimates of the ordinal regression model for the additionally intended number of children are reported. As the table shows, the additionally intended family size is negatively associated with age (at each parity) and with the status of being unemployed or inactive (only at parity zero) and single or separated (at parity one); and it is positively associated with a high level of education (especially at parities one and two), with enrolment in education, and with a high self-positioning on the social scale (in all of the three parities considered).

The variance at the country level is always statistically significant, which justifies the adoption of a multilevel structure. The set of country-level variables explained almost all of the variance at the country level (in all of the three models considered), as suggested by the decline in the country-level variance observed after the country-level variables had been included in the models. The share of highly educated women aged 20 to 45, as well as the share of childcare services for preschool children,[1] are positively associated with the individual's lifetime fertility intentions. In addition, the proportion of people with egalitarian gender attitudes is negatively associated with the additionally intended family size in all of the three models, but it is statistically significant only for parity two. This quite

[1] I also considered the provision of childcare services for children under age three, but I could not retain both indicators in the models due to their high collinearity. I opted for the variable on childcare services for preschool children because it has been more stable over the last decade than services for children under age three. A tremendous increase in the provision of childcare for children under age three has been observed in some of the EU countries in the period 1999-2008. The percentage change is negatively associated with the share of highly educated women in the country (the Pearson's correlation coefficient is equal to -0.7 for 14 countries for which I could compute the entire time series), while the percentage change in the provision of childcare services for preschool children in the same decade is not that high; moreover, it is positively associated with the share of highly educated women (the Pearson's correlation coefficient is equal to +0.2 for the same 14 countries).

unexpected and counter-intuitive result is robust to the inclusion of a different measure of gender equality, the gender empowerment measure, which reflects gender inequalities in political and economic participation, as well as in power over economic resources and captures also the gender gap in earnings[2]. A possible explanation for this finding is that men/fathers who are heavily involved in childcare activities may be more reluctant to have additional children after they already have two. While there is some preliminary support for this explanation in the 2011 EB data (Testa 2012), its validity needs to be further investigated.

5.5 The integrated micro-macro results

A woman's level of education was found to be positively associated with her intended family size at the individual level in the multilevel ordinal regression models with a random intercept (Table 6). To test whether this effect varied across countries, a random slope was also included. These more sophisticated specifications did not, however, improve the fit of the model, which suggests that being highly educated has the same effect on intentions regardless of the country considered. The regressions run on each individual country further revealed that the effect of having a high level of education on reproductive intentions is positive in 19 of the 27 EU countries, and statistically significant in seven of these countries; while it is negative in the remaining eight countries (i.e., Ireland, Denmark, Estonia, Luxembourg, eastern Germany, Czech Republic, Spain, and Malta), but never statistically significant in any of these countries.

Moreover, after the individual-level characteristics were controlled for, the country share of highly educated women was found to be positively associated with the individuals' intended family size. This is a strong and robust result. First, by comparing models with only country level variables with those with both individual and country-level variables, the magnitude and the sign of this coefficient related to the share of highly educated women

[2] The measure is computed by the United Nation Development Programme (UNDP).

did not substantially change, pointing out that the contextual effect of education is not merely due to compositional effects. Second, the country-level education effect was robust to the use of an alternative measure of education (i.e., the country mean of the individual-level variable as computed from the individual records of the 2011 EB dataset) and to the exclusion of the Scandinavian countries from the analysis. Third, the inclusion of other country-level indicators in the model only slightly changed the size of the education variable coefficient suggesting that the variable does not simply capture the effect of some other correlates, like gender equality or the availability of childcare services. Finally, the same positive association between education and intended family size was obtained when the 2006 Eurobarometer data were used. Importantly, in this previous EB round, the contextual effect of education was controlled for a larger number of individual-level variables, such as attendance at religious services, gender-egalitarian attitudes, and the prospective subjective assessment of the household economic situation.

The country share of women enrolled in education was also included in the set of the country-level covariates. The effect of this variable was positive, but only very weak and never statistically significant. Hence, it was not retained in the final models.

Table 6 Estimates from ordinal multilevel regression models on the additionally intended number of children. Beta coefficients

	Parity 0			Parity 1			Parity 2		
MODELS	I	II	II	I	II	II	I	II	II
Individual-level variables									
Age-33 (average)	-	-0.15***	-0.15***	-	-0.17***	-0.17***	-	-0.14***	-0.14***
(Age-33)^2	-	-0.01***	-0.01***	-	-0.01***	-0.01***	-	0	0
Female (reference)	-	0	0	-	0	0	-	0	0
Male	-	0.15*	0.14*	-	0.59***	0.56***	-	0.46***	0.45***
Married (reference)	-	0	0	-	0	0	-	0	0
Cohabiting	-	0.10	0.1	-	0.16	0.14	-	0.12	0.12
Single	-	-0.10	-0.1	-	-0.34*	-0.38*	-	0.22	0.25
Separated	-	-0.24	-0.24	-	-0.84***	-0.85***	-	-0.03	-0.01
Low education (reference)	-	0	0	-	0	0	-	0	0
Medium education	-	0.08	0.08	-	0.28	0.31	-	0.17	0.27
High education	-	0.28+	0.27+	-	0.82***	0.83***	-	0.61*	0.68**
Enrolled in education	-	0.73***	0.74***	-	1.43**	1.44***	-	1.87***	1.95***
Employed (reference)	-	0	0	-	0	0	-	0	0
Unemployed or inactive	-	-0.4***	-0.41***	-	0.01	0.02	-	0.07	0.05
Low positioning on the social scale (reference)	-	0	0	-	0	0	-	0	0
High positioning on the social scale	-	0.30***	0.30***	-	0.26**	0.24*	-	0.44***	0.42**
Country-level variables									
Women with high level of education (%)	-	-	0.02***	-	-	0.02***	-	-	0.02*
People with gender-egalitarian attitudes (%)	-	-	-0.43	-	-	-0.74	-	-	-0.02***
Children under age three in childcare (%)	-	-	0.01+	-	-	0.01**	-	-	0.02**
Onset of fertility postponement	-	-	0.02	-	-	0.01	-	-	-0.02
Log GDP per capita	-	-	-0.15	-	-	0.34	-	-	0.09
First cut-point	-1.47***	-1.06***	30.42	-0.1	0.12	26.48	1.75***	2.16***	-27.87
Second cut-point	-0.67***	-0.06	31.42	1.77***	2.48***	28.83	2.67***	3.18***	-26.85
Third cut-point	1.63***	2.52***	34.01	3.86***	4.69***	31.05	4.41***	4.97***	-25.05
Variance at the country level	0.16***	0.12***	0.05***	0.16***	0.12***	0.01***	0.33***	0.28***	0.06*
Number cases	3556	3556	3556	2096	2096	2096	2600	2600	2600

6 SUMMARY AND DISCUSSION

Using multilevel models on the additionally intended number of children and controlling for the number of children already born and a set of individual-level background variables, I have demonstrated that the share of highly educated women in a European country is positively associated with individuals' lifetime fertility intentions. Unlike in developing countries, in Europe women who invest more resources in human capital do not necessarily plan to have fewer children than their less educated counterparts.

What could be the reason for this positive correlation between women's education and lifetime fertility intentions?

I hypothesised that this result might be explained by factors that increase the income effect and reduce the substitution effect of high levels of education among women in a given country: namely, access to childcare services, gender equality, and good economic conditions. None of these *a priori* statements could be fully supported in the empirical analysis, although the provision of childcare services for preschool children was found to have a positive effect on lifetime fertility intentions. Its inclusion in the model did not, however, substantially change the size of the coefficient related to the share of highly educated women, which points out that the two variables have independent effects on reproductive intentions.

Another explanation is related to the timing of the onset of fertility postponement: the countries in which the postponement of childbearing started earlier may have had more time to adjust to this change by creating more favourable conditions for starting a family for people who typically postpone having children (i.e., highly educated women). The onset of fertility postponement was not found to have a significant effect on reproductive intentions after the individual-level variables were included in the models, which suggests that its impact on fertility intentions may have largely been due to compositional effects.

The positive association between education and fertility intentions could be explained with the fact that the countries in which women are more

likely to reach the highest educational levels are also the countries in which other structural circumstances (that are not controlled for in this analysis) encouraging fertility are more widespread, such as individuals' sense of well-being, levels of trust (Aassve and Pessin 2012), levels of happiness (Margolis and Myrskylä 2011), or life satisfaction (Testa 2012).

The marriage market could also play an important role, given that highly educated women have a greater chance of marrying, a lower probability of divorcing, and a higher probability of having a partner who is better educated, and thus, more likely to plan to have larger families. The marriage market has been indicated as one of the reasons why school reforms which prolonged the time invested in education have had positive effects on fertility levels (Fort et al.2011).

An intriguing explanation—which needs to be supported by empirical data—is related to feedback spill-over effects that the actual fertility of highly educated women might have on the intended fertility of highly educated women of younger reproductive ages: i.e., the more children highly educated women have, the more children highly educated women who have not yet completed their reproductive careers will plan to have, because they will see that it was possible for (presumably older generations of) women to combine both career and family. In other words, I assume that an increase over time in the share of highly educated women in the country will make successive generations of highly educated women more likely to plan to have larger families than their predecessors, who, as innovators of a new pattern of behaviour (i.e., the postponement of childbearing; see Billari and Philipov 2004), faced many more challenges. Two small pieces of evidence in my analysis support this interpretation: the positive cross-country correlation between the share of highly educated women and their actual family size (Figure 5); and the change in the educational gradient by parity observed in the decade 2001-2011 (Figure A.1), which suggests that there are more highly educated women at high (actual and intended) parities in the most recent EB wave than in the preceding ones. Unfortunately, this

interpretation cannot be investigated in more depth with the data at hand but it is certainly a fruitful line of research for future studies.

One should bear in mind that childbearing intentions depend not only on the individuals' preference structure but also on country specific institutional contexts (Neyer 2006). The countries in which the women with higher levels of education have more children might also be the countries in which policies introduced in past years have made it easier to combine work and family life, which might have had positive repercussions for fertility intentions of highly educated women. This is consistent with the similarity observed between the clustering of the countries according to the mean ultimately intended family size (Figure 1) and the clustering of the countries according to the mix of policies in support to families introduced in the past (Thévenon 2011).

The data have some limitations. First, they are cross-sectional and thus they do not allow a dynamic study of the fertility decision-making process. Second, the limited national sample sizes prevents any detailed and reliable analyses at the national level, and moreover, the limited information available at the individual level (the data do not, for example, contain any information on the partner's characteristics) may cause the results to be biased due to omitted relevant variables. Third, they do not allow a modelling of the selection effects generated by the postponement of childbearing among highly educated women. Being at an earlier stage of reproduction implies that highly educated women could still to plan to have a greater number of children, and that their less educated counterparts observed at the same parity (i.e., the control group) can be selected out of the group for some unobserved characteristics, such as fecundity impairments, which may have a depressing effect on their stated lifetime fertility intentions. Finally, 27 countries are not enough to produce very robust and reliable estimates at the country level especially if many country variables are included in the models. Since the regional division of the EB data does not correspond to the NUTS 1 of the Eurostat, it was not possible to conduct the analysis at regional level while taking the regional-level variables from

the statistics provided by Eurostat. It is hoped that it will be possible to address the issue in future studies on the basis of other data.

Nevertheless, the findings reported in the current study provide new insights into the fertility decision-making by bridging a link between macro-level factors and micro-level determinants of reproductive intentions. Building upon existing literature, they reveal that when it comes to lifetime fertility intentions the positive effects stemming from the higher degree of (perceived) behavioural control among highly educated women more than counterbalance the negative effects stemming from their increased level of autonomy and that the positive effects are reinforced in countries with a high share of highly educated women. Indeed, as seen in the analysis reported here, the individuals' preference structure is influenced by aggregate education; this means that low educated women, who live in a society where the average educational level of women is high, have higher fertility intentions than if they live elsewhere. Although nothing was learned about the underlying mechanism, community education deserves attention in future assessment of the importance of education for fertility in Europe.

The results are rich in implications for policy makers. The increased investments in education may have positive effects on fertility levels if the obstacles that prevent highly educated women from combining family life with a career appropriate to their human capital are removed through adequate policy measures. As education tends to be passed on from one generation to the next, these policy interventions will ultimately increase a country's human capital resources, and thus its productivity, not just today, but into the future.

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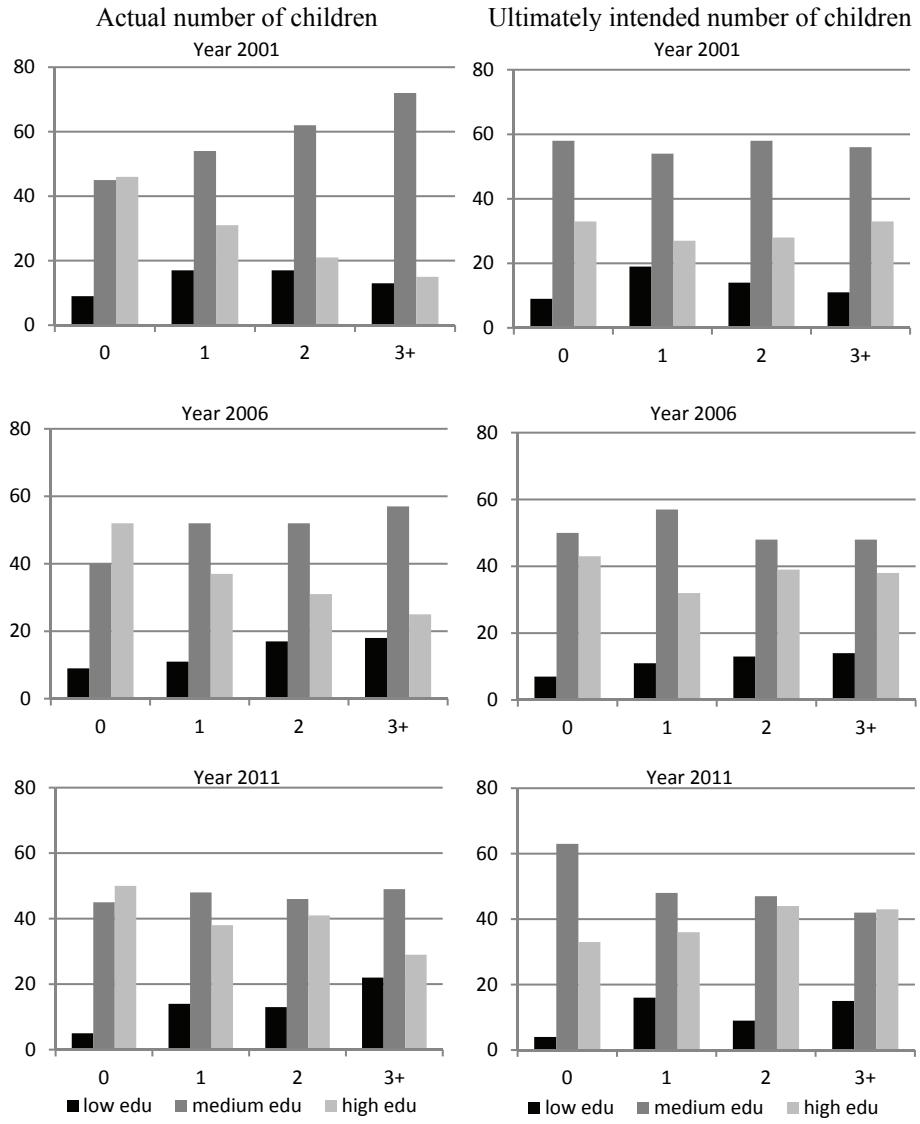
APPENDIX

Figure A1 Educational gradient of each actual and intended parity. Women of reproductive ages (25-45). EU-15. Years 2001, 2006, and 2011.



Note: The proportion of highly educated women in the EU-15 was 29% in 2001, 36% in 2006, and 41% in 2011.

Figure A.2 Mean ultimately intended family size decomposed into the actual and the additionally intended number of children. Women aged 20-45.

a. Highly educated

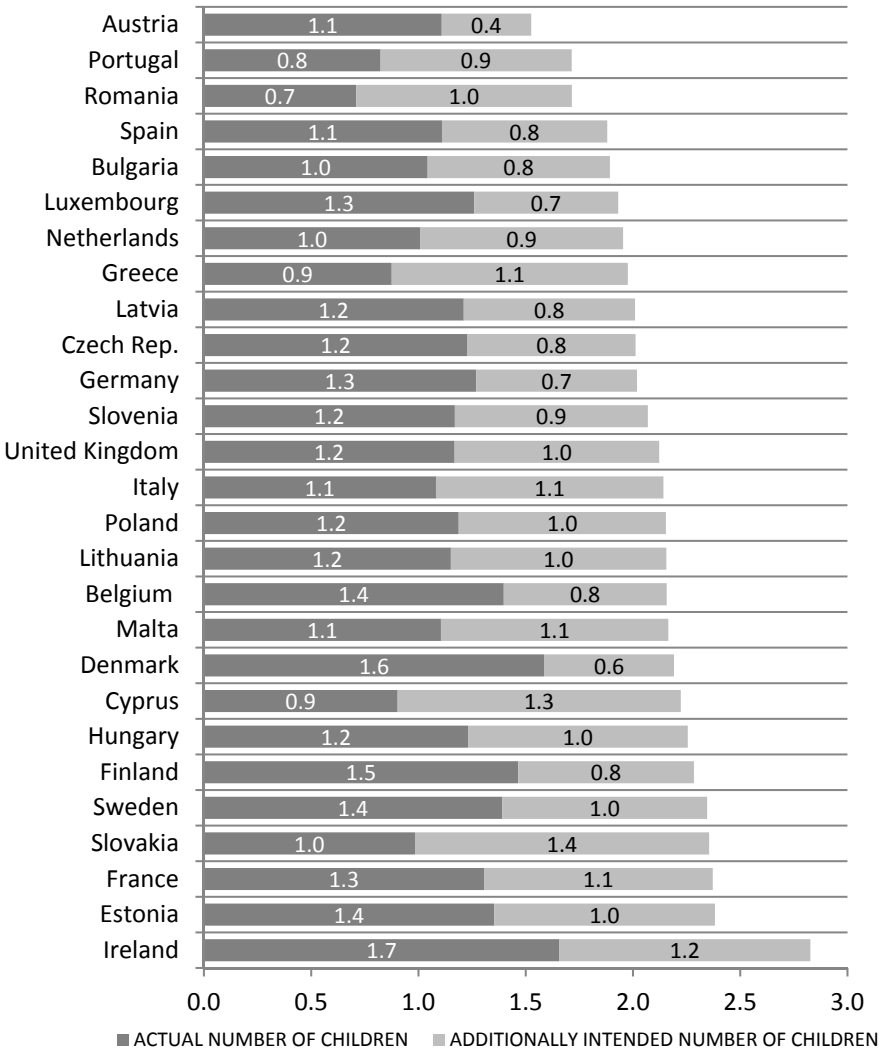
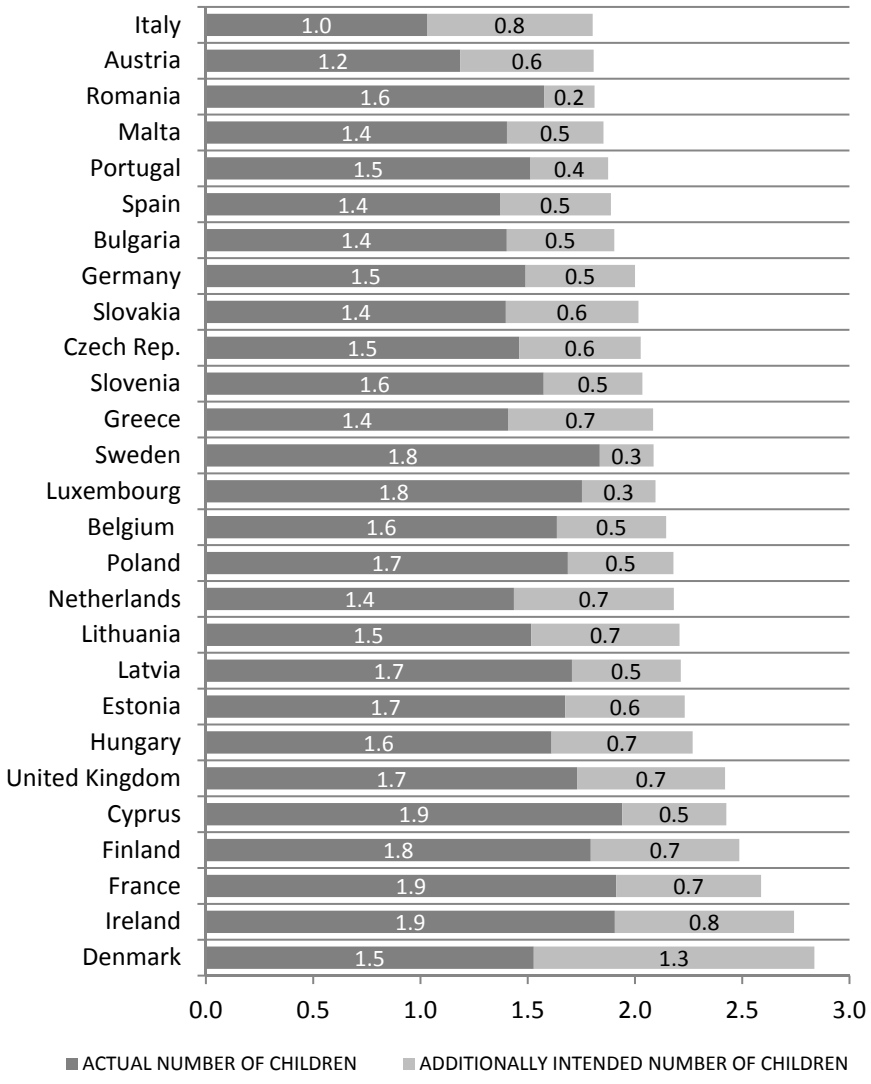


Figure A.2 (continued)

b. Medium or low educated



Source: Author's own elaboration on 2011 Eurobarometer data